<<连续与离散时间信号与系统>>

图书基本信息

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前言

The book is primarily intended for instruction in an upper-level undergraduateor a first-year graduate course in the field of signal processing in electricaland computer engineering.Practising engineers would find the book usefulfor reference or for self study.Our main motivation in writing the book iS todeal with continuous-time（CT）and discrete-time（DT）signals and systemsseparately.Many instructors have realized that covering CT and DT systems inparallel with each other often confuses students to the extent where they are notclear if a particular concept applies to a CT system， to a DT system.or to both.In this book， we treat DT and CT signals and systems. Separately.FollowingPart I， which provides an in~oduction to signals and systems， Part II focuses onCT signals and systems.Since many students are familiar with the theory of CTsignals and systems from earlier courses， Part II Call be taught to such studentswith relative ease.For students who are new to this area， we have supplementedthe material covered in Part 11 with appendices.which are included at the endof the book.Appendices A-F cover background material on complex numbers.partial fraction expansion， difierential equations， difference equations， and areview of the basic signal processing instructions available in M A T L A B.PartIII， which covers DT signals and systems.can either be covered independentlyor in cortiunction with Part II. The book focuses on linear time.invariant（LTI）systems and iS organized asfollows.Chapters 1 and 2 introduce signals and systems.including their math-ematical and graphical interpretations.In Chapter 1.we cover the classificationbetween CT and DT signals and we provide several practical examples in whichCT and DT signals are observed.Chapter 2 defines systems as transformationsthat process the input signals and produce outputs in response to the appliedinputs.Practical examples of CT and DT systems are included in Chapter 2.The remaining fifteen chapters of the book are divided into two parts.PartII constitutes Chapters 3-8 of the book and focuses primarily on the theoriesand applications of CT signals and systems.Part III comprises Chapters 9——17and deals with the theories and applications of DT signals and systems.Theorganization of Parts II and III is described below.

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内容概要

本书涵盖了连续与离散时间信号与系统的方方面面。
全书内容分为三大部分，分别为信号与系统概述、连续时间信号与系统，以及离散时间信号与系统。
书中还有大量的例题和习题，供学生巩固所学内容。
本书既可作为高等院校电子电气等相关专业学生的参考教材，又可供电子电气工程师参考。

作者简介

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主要研究兴趣包括多媒体信号处理、医用图像与视频分析、图像与视频压缩，以及用于实时信号与图像处理的VLSI架构。

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书籍目录

章节摘录

Signals are detectable quantities used to convey information about time-varyingphysical phenomena.Common examples of signals are human speech，temper-ature，pressure，and stock prices.Electrical signals，normally expressed in theform ofvoltage or current waveforms，are some ofthe easiest signals to generateand process. Mathematically,signals are modeled as functions ofone or more independentvariables.Examples ofindependent variables used to represent signals are time。frequency,or spatial coordinates.Before introducing the mathematical notationused to represent signals，let US consider a few physical systems associatedwith the generation of signals.Figure 1.1 illustrates some common signals andsystems encountered in different fields of engineering，with the physical sys-terns represented in the left.hand column and the associated signals included inthe right-hand column.Figure 1.1（a）is a simple electrical circuit consisting ofthree passive components：a capacitor C，an inductor L，and a resistor R.Avoltage v（t）is applied at the input ofthe RLC circuit，which produces an outputvoltage）I（，）across the capacitor.A possible waveform for），（f）is the sinnsoidalsignal showninFig.1.1（b）.Thenotationsv（t）andy（t）includesboththedepen-dent variable，and Y，respectively,in the two expressions，and the independentvariable t.The notation 1，ff）implies that the voltage is a function of time t.Figure 1.1（c）shows an audio recording system where the input signal is an audioor a speech waveform.The function ofthe audio recording system is to conveathe audio signal into an electrical waveform.which is recorded on a magnetictape or a compact diSC.A possible resulting waveform for the recorded electri-cal signal is shown in Fig 1.1（d）.Figure 1.1（e）shows a charge coupled device（CCD）based digital camera where the input signal is the light emitted from a scene.The incident 1ight charges a CCD panel located inside the camera，thereby storing the external scene in terms of the spatial variations of the charges Off the CCD panel.Figure 1.1（g）iUustrates a thermometer that measures the ambienttemperature ofits environment.Electronic thermometers typically use a thermal resistor.known as a thermistor,whose resistance varies with temperature.Thefluctuations in the resistance are used to measure the temperature.Figure.

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